

Application No.: 09/938,035
Amendment Dated: September 3, 2003
Reply to Office Action of: June 3, 2003

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

LISTING OF CLAIMS:

1. (Original) A process for producing L-ascorbic acid, or a sodium, potassium or calcium salt thereof from 2-keto-L-gulonic acid, or a sodium, potassium or calcium salt of 2-keto-L-gulonic acid comprising:

- a. incubating in a solution a substrate comprising 2-keto-L-gulonic acid as a free acid or a sodium, potassium or calcium salt of 2-keto-L-gulonic acid, and a thermoacidophilic microorganism at about 30°C to about 100°C and at a pH from about 1 to about 6 to form L-ascorbic acid or a salt thereof; and
- b. isolating the L-ascorbic acid or salt thereof from the microorganism or the solution.

2. (Withdrawn) A process for producing D-erythorbic acid, or its sodium, potassium or calcium salt thereof from 2-keto-D-gluconic acid or a sodium, potassium or calcium salt of 2-keto-D-gluconic acid comprising:

- a. incubating in a solution a substrate comprising 2-keto-D-gluconic acid as a free acid or as a sodium, potassium or calcium salt of 2-keto-D-gluconic acid,

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and a thermoacidophilic microorganism at about 30°C to about 100°C and at a pH from about 1 to about 6 to form D-erythorbic acid or a salt thereof; and

b. isolating the D-erythorbic acid or salt thereof from the microorganism or the solution.

3. (Currently amended) A process according to claim 1 or ~~claim 2~~ wherein the thermoacidophilic microorganism is a prokaryote.

4. (Original) A process according to claim 3 wherein the prokaryote is a bacteria.

5. (Original) A process according to claim 4 wherein the bacteria belongs to the genus *Alicyclobacillus*.

6. (Original) A process according to claim 5 wherein the bacteria is an *Alicyclobacillus* sp. strain selected from the group consisting of DSM No. 13652, DSM No. 13653, NA-20 (DSM No. 13649), NA-21 (DSM No. 13650), FJ-21 (DSM No. 13651), and mutants thereof.

7. (Original) A process according to claim 5 wherein the bacteria is a biologically and taxonomically homogeneous culture having the identifying characteristics of an *Alicyclobacillus* sp. strain selected from the group consisting of

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DSM No. 13652, DSM No. 13653, NA-20 (DSM No. 13649), NA-21 (DSM No. 13650), and FJ-21 (DSM No. 13651).

8. (Currently amended) A process according claim[[s]] 1 or 2 wherein the solution contains water as the solvent.

9. (Currently amended) A process according to claim[[s]] 1 or 2 wherein the incubation is carried out under aerobic conditions.

10. (Currently amended) A process according to claim[[s]] 1 or 2 wherein the incubation is carried out under aerobic conditions in the presence of nutrients.

11. (Currently amended) A process according to claim[[s]] 1 or 2 wherein the concentration of the substrate in the solution is from about 5% (w/v) to about 20% (w/v), based on the amount of free acid.

12. (Original) A process according to claim 11 wherein the concentration of the substrate in the solution is from about 10% (w/v) to about 15% (w/v), based on the amount of free acid.

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13. (Currently amended) A process according to claim[[s]] 1 or 2 wherein the incubation is carried out at about 40°C to about 95°C.

14. (Original) A process according to claim 13 wherein the incubation is carried out at about 55°C to about 95°C.

15. (Currently amended) A process according to claim[[s]] 1 or 2 wherein the incubation is carried out at a pH from about 1.0 to about 4.5.

16. (Original) A process according to claim 15 wherein the incubation is carried out at a pH from about 1.5 to about 3.0.

17. (Withdrawn) An isolated microorganism selected from the group consisting of *Alicyclobacillus* sp. NA-20 (DSM No. 13649), *Alicyclobacillus* sp. NA-21 (DSM No. 13650), and *Alicyclobacillus* sp. FJ-21 (DSM No. 13651).

18. (Original) A process for producing L-ascorbic acid or a salt thereof from 2-keto-L-gulonic acid or a salt thereof comprising:

a. contacting 2-keto-L-gulonic acid with a microorganism selected from the group consisting of *Alicyclobacillus* sp. NA-20 (DSM No. 13649), *Alicyclobacillus* sp. NA-21 (DSM No. 13650), and *Alicyclobacillus* sp. FJ-21 (DSM No. 13651) in a culture medium sufficient to support the growth of the microorganism under the following conditions:

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- i. a temperature of about 30°C to about 100°C; and
 - ii. a pH from about 1 to about 6; and
- b. isolating the L-ascorbic acid or a salt thereof from the microorganism or the medium.

19. (Withdrawn) A process for producing D-erythorbic acid or a salt thereof from 2-keto-D-gluconic acid or a salt thereof comprising:

a. contacting 2-keto-D-gluconic acid with a microorganism selected from the group consisting of *Alicyclobacillus* sp. NA-20 (DSM No. 13649), *Alicyclobacillus* sp. NA-21 (DSM No. 13650), and *Alicyclobacillus* sp. FJ-21 (DSM No. 13651) in a culture medium sufficient to support the growth of the microorganism under the following conditions:

- i. a temperature of about 30°C to about 100°C; and
 - ii. a pH from about 1 to about 6; and
- b. isolating the D-erythorbic acid or a salt thereof from the microorganism or the medium.

20. (Withdrawn) A microorganism that produces L-ascorbic acid or a salt thereof or D-erythorbic acid or a salt thereof having the following characteristics:

- a. an rDNA sequence that is at least 98.1% identical to SEQ ID NOs: 1, 2 and 3 using the Genetyx-SV/R software program;
- b. a rod-shaped morphology;
- c. a width of about 0.8 μm ;

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- d. an inability to grow under anaerobic conditions;
- e. exhibiting catalase activity;
- f. ω -Cyclohexylic acid as its major fatty acid;
- g. an ability to grow at a pH of 3.0 and a temperature of 60°C;
- h. an inability to grow under the following conditions:

pH	Temperature
3.0	30°C
6.5	60°C
6.5	30°C

- i. an ability to produce a (1) L-ascorbic acid or a salt thereof from 2-keto-L-gulonic acid or a salt thereof, (2) D-erythorbic acid or a salt thereof from 2-keto-D-gluconic acid or a salt thereof, or (3) both L-ascorbic acid or a salt thereof and D-erythorbic acid or a salt thereof from 2-keto-L-gulonic acid or a salt thereof and 2-keto-D-gluconic acid or a salt thereof, respectively.